

Fast GC for Space Applications Based on PIES Technology, Phase I



Completed Technology Project (2005 - 2005)

Project Introduction

Development of a novel analytical instrument which combines the advantages of fast GC and a detector capable of identifying species is proposed. Experiments in the limited-space environment require from a GC system maximum productivity and universality with minimal resource consumption. A combination of a short-column fast-chromatographic separation technique with a low-power-consumption miniature detector capable of identifying unknown species would be an ideal instrument for flight analysis. The proposed instrument will employ the technology of Penning Ionization Electron Spectroscopy in plasma (PIES) which provides an excellent opportunity for the development of a fast-GC/PIES combination that satisfies these requirements. A new micro-PIES detector is proposed that uses continuous flowing afterglow discharge cell design enabling the measurement of PIES spectra in continuous flow at atmospheric pressure of the carrier gas. PIES spectra for permanent gases will be recorded in Phase I by a micro-PIES detector prototype. In Phase II of the project, a commercially viable micro-PIES detector and an analytical device combining fast GC and the micro-PIES detector, will be developed.

Anticipated Benefits

Portable analytical devices which would provide fast and sensitive identification of analytes are required in the majority of the GC detection fields. The advantages of the proposed technology are in the optimal combination of the small size and weight, simplicity and ruggedness of the design, and the ability to identify unknown species. Such technologies are required for various industrial, forensic, military, security, research, environmental and educational needs. Some specific applications include microelectronics; airport security; weapons drug, alcohol, and other contraband detection; landmine detection; individual/consumer applications and hazardous waste treatment, among others.



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

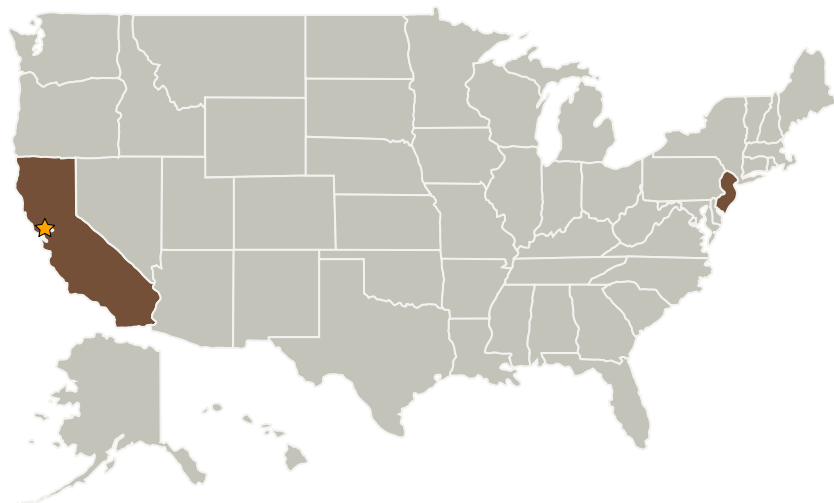
Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Lenterra, Inc.	Supporting Organization	Industry	West Orange, New Jersey

Primary U.S. Work Locations

California	New Jersey
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Dan Kojiro

Principal Investigator:

Michael Kozhevnikov

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.2 Heat Transport